

Pavel Florensky, The Symbols of the Infinite

Pavel Florenskij has been introduced to us as the Russian Leonardo da Vinci, a Renaissance Universal Man pursuing an integral world view. In this first session we are focussing on Florenskij the theologian and mathematician, and in my twenty minutes I shall be sharing with you some reflections on whether, and if so in what way, one can integrate the two disciplines within one and the same person. I shall then give an account in some, but not much, detail of Florenskij's position on this issue.

The title of Florenskij's 1904 paper that provides the basis of my considerations, namely, "The symbols of the infinite. An essay on the ideas of G. Cantor,"¹ points simultaneously to a specific piece of mathematics and to its theological connection. The piece of mathematics in question is the Theory of Transfinite Numbers, put forward by the German mathematician Georg Cantor in 1895, the same Cantor of set theory fame. Cantor was not only a pure mathematician; he was also extremely concerned with the philosophical and theological implications, as he and some of his contemporaries saw them, of his mathematical work on the infinite. This mathematician-theologian is the Cantor whom Florenskij embraced, and whom he introduced to a Russian public. Let me now discuss the personal integration of theology and mathematics in the context of four positions on the relationship between theology and mathematics.

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¹ My English translation of the Italian translation of the paper, Pavel Florenskij, "I simboli dell'infinito. (Saggio sulle idee di G. Cantor)," in *Il simbolo e la forma*. Scritti di filosofia della scienza, Nuova Cultura 168, ed. Natalino Valentini and Alexandre Gorelov, trans. Claudia Zonghetti (Torino: Bollati Boringhieri, 2007), 25-80.

Position 1: Mathematics has no bearing either on theology or on religious beliefs

Thus, they can coexist within the person, though only living in separate and disjoint spaces. I would think that in practice, many mathematicians and theologians today behave in this way.

Position 2: Mathematics is incompatible with theology and thus also with religious belief

In this case a person of integrity would discard at least one of the two. Incidentally, such a moral obligation seems to have been ignored by some Roman Catholic intellectuals at around the beginning of the twentieth century (the time span in which Florenskij lived), prompting a rebuke in the anti-Modernism encyclical *Pascendi*² and an inclusion in the newly-introduced oath to be taken by all clergy and seminary professors. I quote a sentence from the oath:

I also condemn and reject the opinion of those who say that a well-educated Christian assumes a dual personality—that of a believer and at the same time of a historian, as if it were permissible for a historian to hold things that contradict the faith of the believer, or to establish premises which, provided there be no direct denial of dogmas, would lead to the conclusion that dogmas are either false or doubtful.³

For “historian,” of course, read “practitioner of any science, including mathematics.” It is a fact that some theologians considered Cantor’s transfinite numbers incompatible with Christian theology. This is because it was thought to imply Pantheism, i.e. that there is no distinct personal God but rather the divinity is identical with all reality. Thus, Florenskij reports that the eminent Austrian Jesuit theologian Cardinal Johann Baptist Franzelin had expressed this concern in a letter to Cantor, who then provided him with clarifications and explanations. The Cardinal was convinced: he withdrew his objections and attested that there was no danger to religious truth in Cantor’s work.⁴ The devout Lutheran Cantor

² See “18. The Methods of Modernists.” http://w2.vatican.va/content/pius-x/en/encyclicals/documents/hf_p-x_enc_19070908_pascendi-dominici-gregis.html. Accessed 1 June 2018.

³ See Pope Pius X, Oath against Modernism (1 September 1910). <https://www.ewtn.com/library/papaldoc/p10moath.htm>. Accessed 1 June 2018.

⁴ *I simboli dell'infinito*, 74.

even sent a letter on the correct theological interpretation of his work to Pope Leo XIII himself, and addressed several pamphlets to him.⁵

Position 3: Mathematics has a positive bearing on theology and thus too on religious belief

This is the position of Florenskij (and of Cantor).

The piece of mathematics we are focussing on is Cantor's Theory of Transfinite Numbers. I shall say something about these actual infinities and then go into the question of their significance to theology.

Let us recall Prof. Lauri's explanation of the basis for Cantor's Theory of Transfinite Cardinals with the help of a couple of sentences:

- 1) The size of the set of evangelists is four. What about the size of the infinite set of prime numbers?
- 2) 2 sets shall be said to have the same cardinality (= size) if and only if there is a 1-1 correspondence between them.
- 3) A proper subset of an infinite set can have the same cardinality as the original set.
- 4) The "bizarre twist"! An infinite set can have a "bigger" cardinality than another infinite set. And now Cantor took the, by hindsight obvious, step of creating a system of new numbers for the size of these differently-sized infinite sets – the system of transfinite cardinals!

How, now, do these mathematical entities bear on theology?

Let us look at an argument which Florenskij, following Cantor, highlights from the work *De Principiis* of one of the greatest Christian theologians, Origen of Alexandria (185-254 C.E.). I quote the Patristic specialist J.W. Trigg:

God, Origen held, must have created a limited number of rational creatures, as an infinite number of them would be incomprehensible even to God, and to allow that the All-knowing could fail to comprehend anything would be to postulate what is not possible, a self-contradiction in the nature of God.⁶

Here is my tongue-in-cheek version of it. Had God created an infinite number of rational creatures, He would not have been able to comprehend them, which goes counter to His being omniscient. So, to avoid that contradiction

⁵ Joseph W. Dauben, "Georg Cantor and Pope Leo XIII: Mathematics, Theology, and the Infinite," *Journal of the History of Ideas* 38, no. 1 (1977): 85-108.

⁶ As quoted in "Rational Creatures." <http://www.copticchurch.net/topics/patrology/schoolofalex2/chapter11.html>. Accessed 1 June 2018.

He was forced to create only a finite number of them, which goes counter to His omnipotence. Looks as if God's in real trouble! Jest aside, the sentence which is important to us is "An infinite number of rational creatures would be incomprehensible even to God." Florenskij says that for Origen "an infinite set cannot exist, since if it ever existed, it would be captured – like every set – by means of a number, but there exists no infinite number." Cantor had the highest opinion of Origen, whose works he had extensively studied. He reacted to Origen's position with understanding: Origen was right in the sense that the numbers at his disposal were inadequate, but now he, Cantor, has created the transfinite numbers. The latter had removed the stumbling block troubling the theist – and here lies the reason why I have put Cantor and Florenskij in Position 3: for them, this piece of mathematics has a positive bearing on theology and faith.

So Florenskij has demolished that argument against theism, but does he also make the strong claim that the transfinite numbers prove the existence of God? Let us examine the two statements relevant to this question which he makes in the paper under consideration.

The first: "No, not only does the Transfinite not contradict theism, but on the contrary it is necessary for it," i.e. If you believe in God, then you must accept the transfinite numbers. Let us be careful not to swap the antecedent and the consequent of the subjunction he affirms! So, no, he is not making the strong claim here.

The second: "... it has been discovered that the idea of the transfinite presupposes the idea of the Absolute and that if we accept the first we have no right to reject the second." The two parts of the conjunction are logically equivalent, so we only have one statement being repeated. Yes, that statement is the strong claim. And, as far as I can see, it comes out of the blues, as Florenskij presents no argument whatsoever in its favour.

Finally, let me for a moment turn my and your attention away from the methodologically prejudiced activity of producing arguments which mechanically prove theses in favour of a tableau-like Weltbild, Florenskij's world picture. Florenskij depicts two actual infinities, one such that no other infinity can be bigger than it, and one which can have other infinite quanta bigger than it, which are realized in three contexts. "In the first place in as much as such an actual infinity realizes itself in the supreme perfection in an independent and supernatural reality, in short *in Deo* ..." This infinity is the Absolute. "In the second place, the actual infinity can be supposed *in concreto*, in the dependent world, in creation." It can be called the Transfinite.

In the third place, finally, the actual infinite can be *in abstracto*, in the spirit, in as much as it has the possibility of comprehending the Transfinite in nature, and, up to a certain point, the Absolute in God. In the latter case the infinite takes the name of Symbols of the Infinite. Specifically, when it is a case of knowledge of the Transfinite, these symbols take the name of transfinite numbers and transfinite types.⁷

This brings us in the most natural way to the last position,

Position 4: Mathematics has no bearing on theology but a positive bearing on religious belief

This is the position I personally would take. I'll only make a couple of remarks as it is outside the scope of our meeting today.

The believer holds faith to be a gift and realizes that he cannot capture God – no, not even using transfinite numbers! But this is not to declare redundant our esteemed colleagues from the Department of Fundamental Theology! A mature faith, as I see it, needs to cultivate both theological argumentation and a religious *Weltbild* which draws in it the positive achievements in all spheres of human activity – including mathematics.

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⁷ All the quotations in this paragraph are from *I simboli dell'infinito*, 33.